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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER AUSTIN, MELISSA J				
ART UNIT		PAPER NUMBER		
1745				

DATE MAILED: 11/08/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/660,807

Applicant(s)

OMARU, ATSUO

Examiner

Melissa Austin

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 September 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Drawings

2. The drawings received September 11, 2003 are acceptable for examination purposes.

Information Disclosure Statement

3. An Information Disclosure Statement (IDS) has not been filed as of the mailing of this action.
4. The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609 A(1) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

Specification

5. The abstract of the disclosure is objected to because it is too lengthy (more than 150 words). Correction is required. See MPEP § 608.01(b).
6. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.
7. The disclosure is objected to because of the following informalities:
 - Applicant should check paragraph 2 of <sample 1> (pg. 34) to confirm that the correct chemical formulas are given.

This list is not exhaustive due to the length of the specification.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

8. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claim 10 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The claim cites a "band shape," and the specification includes no definition or illustration of what shape is considered a band shape.

9. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 6 and 7 recite the limitation "said polymer" in lines 1 and 2 the claims. There is insufficient antecedent basis for this limitation in the claim. It appears that the dependency of these claims should be directed to claim 6, which introduces a polymer, instead of claim 5, which does not include a polymer. For purposes of examination and application of prior art, the claims have been handled as being dependent on claim 6.

Claim Rejections - 35 USC § 102

10. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section

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351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

11. Claims 1, 2, 3, 5, and 9 rejected under 35 U.S.C. 102(e) as being anticipated by Mizutani et al. (US 2004/0023119).

With respect to claim 1, Mizutani teaches a battery containing a positive electrode with an active material, a non-aqueous electrolyte containing an electrolyte salt, and a negative electrode (Pg. 1, [0014]). The negative electrode contains of a thin film of Group 14 elements or compounds thereof formed by thin-film formation technology, such as sputtering, electroplating, and electroless plating (Pg. 2, [0025]; Pg. 3, [0026]). The electrode also contains an active material compound layer containing one or more of Sn, Si, Sn compounds, Si compounds, and carbonaceous material, which may be graphites or other types of carbon (Pg. 3, [0029]).

Regarding claim 2, the negative electrode thin film layer includes Group 14 elements such as Si, Sn, and Ge (Pg. 2, [0025]).

Regarding claim 3, it is allowable that the negative electrode thin film layer contains any one of or two or more of Sn, Si, Sn compounds, Si compounds, and carbonaceous material (Pg. 4, [0035]).

Regarding claim 5, the negative electrode active material compound layer is formed by adding binder to the aforementioned negative electrode active material (see claim 1 above: Pg. 3, [0030]).

Regarding claim 9, the positive electrode active material is composed of lithium composite oxide expressed by Li_xMO_2 , where x is 0.5-1.1 and M is a transition metal (Pg. 2, [0021]).

Applicant cannot rely upon the foreign priority papers to overcome this rejection because a translation of said papers has not been made of record in accordance with 37 CFR 1.55. See MPEP § 201.15.

12. Claims 1, 2, 4, 6, and 9 are rejected under 35 U.S.C. 102(e) as being anticipated by Tamura et al. (US 2003/0108795).

With respect to claim 1, Tamura teaches a battery with a nonaqueous electrolyte containing an electrolyte solute (in the form of salts: Pg. 3, [0041], [0042]), a positive electrode containing an active

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material (Pg. 4, [0041], [0043]), and an anode. The anode includes a thin film layer of a metal that does not alloy with lithium, a thin film layer of metal that does alloy with lithium, a mixed layer composed of these metals between the thin film layers (Pg. 1, [0007]); a thin film of hard carbon on the opposite surface of the metal that alloys with lithium than the metal that does not alloy with lithium (Pg. 3, [0033]); and a thin film interlayer between the thin film of carbon and the metal that alloys with lithium (Pg. 3, [0040]). The thin films may be formed of electrochemical processes such as electroplating, electroless plating, CVD, sputtering, vapor evaporation, and spraying (Pg. 2, [0028]). The use of metals that alloy with lithium for the negative electrode material is known (Pg. 1, [0005]).

Regarding claim 2, the metal that alloys with lithium is a metal that forms a solid solution or intermetallic compound with lithium; examples include Sn, Ge, Al, In, Mg, Pb, Zn, Bi, and the like (Pg. 1, [0017]).

Regarding claim 4, the metal that does not alloy with lithium (Pg. 2, [0028]), the carbon (pg. 3, [0038]), and the interlayer (Pg. 3, [0040]) are formed as thin films.

Regarding claim 6, the metal that does not alloy with lithium may be used as the anode substrate (Pg. 1, [0008]).

Regarding claim 9, the active materials for the positive electrode include lithium-containing transition metal oxides, such as LiCoO_2 , LiNiO_2 , and LiMnO_2 .

Claim Rejections - 35 USC § 103

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

14. Claims 6 and 8 rejected under 35 U.S.C. 103(a) as being unpatentable over Tamura et al. (US 2003/0108795) in view of Skotheim et al. (US 2002/0012846). Tamura teaches the elements of claim 1 as

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discussed in the above 35 USC 102 rejection, incorporated herein; however, the reference fails to teach the use of a polymer as a substrate for the anode.

With respect to claim 6, Skotheim teaches the use of a metal foil, polymer film, and metallized polymer film as the anode substrate (Pg. 3, [0035]) in a nonaqueous cell having a multi-layer anode structure.

With respect to claim 8, Skotheim lists polyethylene terephthalate and polybutylene terephthalate as examples of polymer films that may be used as substrates for the anode. The density of polyethylene terephthalate ranges from 1.3 to 1.33 g/cc, and the density of polybutylene terephthalate ranges from 1.17 to 1.54 g/cc (from www.matweb.com; polyethylene terephthalate and polybutylene terephthalate, respectively).

These substrates are useful as supports for the active material and may provide additional stability for handling of the electrode during cell fabrication. Conductive substrates may also function as current collector for efficiently collecting electrical current and providing efficient surface for attachment of electrical contacts leading to the external circuit (Pg. 3, [0035]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used the substrates as taught by Skotheim in the battery as taught by Tamura in order to provide additional stability for handling of the electrode during cell fabrication, provide a current collector for efficiently collecting electrical current, and provide efficient surface for attachment of electrical contacts leading to the external circuit

15. Claims 6 and 8 rejected under 35 U.S.C. 103(a) as being unpatentable over Mizutani et al. (US 2004/0023119) in view of Skotheim et al. (US 2002/0012846). Mizutani teaches the elements of claim 1 as discussed in the above 35 USC 102 rejection, incorporated herein; however, the reference fails to teach the use of a polymer as a substrate for the anode.

With respect to claim 6, Skotheim teaches the use of a metal foil, polymer film, and metallized polymer film as the anode substrate (Pg. 3, [0035]) in a nonaqueous cell having a multi-layer anode structure.

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With respect to claim 8, Skotheim lists polyethylene terephthalate and polybutylene terephthalate as examples of polymer films that may be used as substrates for the anode. The density of polyethylene terephthalate ranges from 1.3 to 1.33 g/cc, and the density of polybutylene terephthalate ranges from 1.17 to 1.54 g/cc (from www.matweb.com; polyethylene terephthalate and polybutylene terephthalate, respectively).

These substrates are useful as supports for the active material and may provide additional stability for handling of the electrode during cell fabrication. Conductive substrates may also function as current collector for efficiently collecting electrical current and providing efficient surface for attachment of electrical contacts leading to the external circuit (Pg. 3, [0035]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used the substrates as taught by Skotheim in the battery as taught by Tamura in order to provide additional stability for handling of the electrode during cell fabrication, provide a current collector for efficiently collecting electrical current, and provide efficient surface for attachment of electrical contacts leading to the external circuit

16. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tamura et al. (US 2003/0108795) in view of Skotheim et al. (US 2002/0012846) and further in view of Hitachi Maxell (JP 48-061944). Tamura and Skotheim teach the elements of claim 6 as discussed in the above 35 USC 103 rejection, incorporated herein. The references, however, fail to disclose a high molecular weight polymer containing olefinic resin, sulfur-containing resin, nitrogen-containing resin, or fluorine-containing resin.

Hitachi Maxell teaches an electrode support containing electrolyte solution resistant resins, such as fluorine resins. The use of resin minimizes the amount of active material deposited on the surface, and thus stabilizes the electrode.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used an electrode support containing a resin, such as a fluorine resin as taught by Hitachi Maxell, in the battery as taught by Tamura and Skotheim in order to stabilize the electrode.

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17. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mizutani et al. (US 2004/0023119) in view of Skotheim et al. (US 2002/0012846) and further in view of Hitachi Maxell (JP 48-061944). Mizutani and Skotheim teach the elements of claim 6 as discussed in the above 35 USC 103 rejection, incorporated herein. The references, however, fail to disclose a high molecular weight polymer containing olefinic resin, sulfur-containing resin, nitrogen-containing resin, or fluorine-containing resin.

Hitachi Maxell teaches an electrode support containing electrolyte solution resistant resins, such as fluorine resins. The use of resin minimizes the amount of active material deposited on the surface, and thus stabilizes the electrode.


Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used an electrode support containing a resin, such as a fluorine resin as taught by Hitachi Maxell, in the battery as taught by Tamura and Skotheim in order to stabilize the electrode.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Kawakami et al. (6,051,340) discloses an anode containing a metal capable of being alloyed with lithium, a metal incapable of being alloyed with lithium in thin film. Park et al. (US 2003/0039889) discloses a battery having an anode active material layer in the form of a multi-layered film formed by stacking a silver layer and a silicon-metal layer.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Melissa Austin whose telephone number is (571) 272-1247. The examiner can normally be reached on Monday - Friday, 7:15 AM - 3:45 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.


Patrick Ryan
SPB-Art Unit 1745